National Institute of Environmental Health Sciences

# Heat-related respiratory hospital admissions in Europe in a changing climate: A health impact assessment

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**Abstract:**

Objectives: Respiratory diseases are ranked second in Europe in terms of mortality, prevalence and costs. Studies have shown that extreme heat has a large impact on mortality and morbidity, with a large relative increase for respiratory diseases. Expected increases in mean temperature and the number of extreme heat events over the coming decades due to climate change raise questions about the possible health impacts. We assess the number of heat-related respiratory hospital admissions in a future with a different climate. Design: A Europe-wide health impact assessment. Setting: An assessment for each of the EU27 countries. Methods: Heat-related hospital admissions under a changing climate are projected using multicity epidemiological exposure-response relationships applied to gridded population data and country-specific baseline respiratory hospital admission rates. Timesseries of temperatures are simulated with a regional climate model based on four global climate models, under two greenhouse gas emission scenarios. Results: Between a reference period (1981-2010) and a future period (2021-2050), the total number of respiratory hospital admissions attributed to heat is projected to be larger in southern Europe, with three times more heat attributed respiratory hospital admissions in the future period. The smallest change was estimated in Eastern Europe with about a twofold increase. For all of Europe, the number of heat-related respiratory hospital admissions is projected to be 26 000 annually in the future period compared with 11 000 in the reference period. Conclusions: The results suggest that the projected effects of climate change on temperature and the number of extreme heat events could substantially influence respiratory morbidity across Europe.

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## Resource Description

**Climate Scenario :**

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

**Special Report on Emissions Scenarios (SRES) Scenario:** SRES A1, SRES A2

**Other Climate Scenario:** SRES A1B

**Exposure :**

weather or climate related pathway by which climate change affects health

Temperature

**Temperature:** Extreme Heat, Fluctuations

**Geographic Feature:** ☑

resource focuses on specific type of geography

None or Unspecified

**Geographic Location:** ☑

resource focuses on specific location

Non-United States

**Non-United States:** Europe

**Health Impact:** ☑

specification of health effect or disease related to climate change exposure

Respiratory Effect

**Respiratory Effect:** Other Respiratory Effect

**Respiratory Condition (other) :** respiratory hospital admissions

**Mitigation/Adaptation:** ☑

mitigation or adaptation strategy is a focus of resource

Mitigation

**Model/Methodology:** ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Other Projection Model/Methodology

**Other Projection Model/Methodology:** atmospheric climate model RCA3 downscales results from CCSM3, ECHAM5, HadleyCM3, ECHAM4

**Resource Type:** ☑

format or standard characteristic of resource

Research Article

**Timescale:** ☑

time period studied

Medium-Term (10-50 years)

**Vulnerability/Impact Assessment:** ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content